METHD FOR READING SENSOR

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a method for reading sensor. More particularly, the present invention relates to a method for reading sensor that stores data in numerous memory cells that are independent from each others.

2. Description of the Prior Art

A variety of sensors have been applied popularly in modern industry and manufactures, such as image sensors, alcohol sensors, photoelectric switches and the like. Generally, except sensors only for detecting the existence of objects, all sensors for sensing contents of objects comprise a plurality of sensing units for sensing and a plurality of memory cells for storing the sensed data. Of course, sensing units and memory cells can be separated; or initially combining one sensing unit and one memory cell as a basic unit, and then combine a plurality of basic units to be a whole sensor.

In prior arts, all sensed data are stored in memory cells. Thus, the way for reading sensor is to read the contents of all cells from the first one. Referring to FIG. 1A, initially prepare the sensor 10 with M memory cells 11; then use sensor 10 to sense a certain object to make each memory cell 11 store a data (data1, data2, ... data M); finally one by

one read out the data composed of data1, data2, ...until data M. For instance, use shift register to record charge movement within all basic units of a image sensor by using CCD (charge-coupled device), wherein read restored data in each basic unit sequentially from the first one.

However, considering somewhat application of sensors, frequently only parts of memory cells stores non-zero signals and users may need (or interest in) some parts of sensed contents rather than the whole one during sensing the content of a certain object. Thus the prior art is usually inefficient.

Referring to FIG. 1B and FIG. 1C, for example, considering photoelectric sensor 15 in the scanning head 14 of a scanner, the length of the object 16 parallel with the photoelectric sensor 15, waiting for being scanned, is possibly smaller than the length of the photoelectric sensor 15. A user may interest in a certain part of image (172) of the object rather than the whole image (171, 172, 173). Thus, in the prior arts, it is obviously not efficient that the user must read the whole data in the photoelectric sensor 15 to acquire and to deal with demanded partial data.

Therefore, it is necessary to develop a new method for reading sensor to let the user more efficiently read demanded data.

SUMMARY OF THE INVENTION

It is one object of the present invention to resolve the defects of the prior arts and to provide a method for reading sensor more

efficiently.

It is another object of the present invention to provide a method for reading data in all memory cells sequentially started from the beginning without changing the specification of the present sensors.

It is a further object of the present invention to provide a method for reading data in all memory cells sequentially from the beginning with the premise not to change the format for storing data.

The present invention comprises one or more of the following features:

(1) Sensors adapting to each basic unit (at least each memory cell) is independent from each other;

(2) Proceeding reading, initially receive a parameter (positive integer) and number these units sequentially, then ignore those units with number smaller than the parameter and start to read all other units from the unit with number equal to the parameter.

(3) Proceeding reading, initially receive a parameter and an attached parameter, then stop reading sensor until the unit with number equal to the attached parameter (Namely, only read units with number between the parameter and the attached parameter.).

(4) The assignment of the parameter and the attached parameter can be user-defined, the parameters of sensors and determination in the process of sensing according to stored contents.

(5) Before proceed reading, only read units between the specific units corresponding to these parameters during sensor reading, i.e. read two specific units and units between these two units, and pair these

specific units off from the first one of the specific units.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1A to FIG. 1C are flow charts and diagram of the prior art;

FIG. 2A to FIG. 2C are flow charts of a first embodiment of the present invention;

FIG. 3A is a flow chart of a second embodiment of the present invention;

FIG. 3B is a flow chart of a third embodiment of the present invention; and

FIG. 4 is a flow chart of a fourth embodiment of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

FIG. 2A is a method for reading sensor according to a first embodiment of the present invention, which comprises the following steps:

Referring to step 21, connecting a linear sensor and receiving a parameter. The linear sensor has numerous memory cells that are arranged in linear order and each independent on others, wherein the parameter N is a positive integer. Besides, these memory cells are each

independent on others and can be read separately, e.g. CMOS memory cells.

Referring to step 22, numbering each memory cell one by one from the first memory cell to the (N-1)-th memory cell according to the linear arrangement order.

Referring to step 23, reading the content of each unnumbered memory cell sequentially from the N-th memory cell according to the linear arrangement order.

The first embodiment also can be described as FIG. 2B. At initial, preparing a sensor 20 with M memory cells 24; then using sensor 20 to sense a certain object to make each memory unit 24 to store a data (data 1, data 2, ... data M); finally receiving parameter N first and then read the actually demanded data composed from data N, data N + 1, ... data M.

Obviously, one feature of the first embodiment is to receive parameter N first and then to read data N, data N + 1, ... data M stored in the memory cells with number not smaller than N one by one from the memory cell with number N.

Comparing to the prior art, the first embodiment does not read the data in the memory cells with number between 1 and N-1. When the data stored in the memory cells with number between 1 and N-1 is zero or is not user-demanded (i.e. the situation referring to FIG. 1B and FIG. 1C), the first embodiment can omit the time from reading or storing

unnecessary data from the memory cells and can improve the performance of reading sensor.

Of course, in the first embodiment, parameter N is usually not a permanent value and is changeable. For instance, a new N can be generated prior to whenever a sensor is to be read. Generally, the parameter can be set up by manually input before reading the linear sensor; it also can be generated automatically by the linear sensor, i.e. it can be generated depending on the software inner default rules and the sensed value; and it can be a specific memory cell of the linear sensor stored the first nonzero signal.

The situation referring to FIG. 1C, sometimes some of these memory cells not only from the start but also at the end do not store meaningful (or user-demanded) data. However, only some parts within these memory cells store meaningful (or user-demanded) data. Therefore, the feature of the first embodiment to read the memory cell corresponding to the parameter and the later memory cells of it can be taken one step ahead to expand. That is not only to just read the memory cell corresponding to the parameter and later memory cells of it but also to read only the memory cell corresponding to another parameter and the memory cells prior to it

Namely, referring to FIG. 2C, the first embodiment can be modified to prepare the sensor 20 with M memory cells 24 initially; then using sensor 20 to sense a certain object, whereby make each memory cell 24 to store a data (data 1, data 2, ... data M); finally receiving parameters N and L first and read the actually demanded data 25

composed with data N, data N+1, ... data L sequentially, wherein L is larger than N.

In other words, the first embodiment can receive attached parameter L at the same time to receive parameter N, wherein L is a positive integer larger than N, and read the contents of the memory cells between the memory cells corresponding to N and L one by one depending on the linear arrangement order. After reading L-th memory cell of the linear sensor, stop reading the remaining memory cells unnumbered yet. Generally, the attached parameter can be set up by manually input before reading linear sensor; it also can be generated automatically by the linear sensor, i.e. it can be generated depending on the software inner default rules and the sensed value; and it can be a specific memory cell of the linear sensor stored the first nonzero signal.

Because the first embodiment only relates to the memory cells that must have a fixed arrangement order and each of them can be read independently, the first embodiment does not relate to the detail (i.e. the detail and the relative position of each memory cell) of sensors.

FIG. 3A is a flow chart of a second embodiment of the present invention, which comprises the following steps:

Referring to step 31, connecting a 2-D sensors and receiving a specific amount (X) of parameters and the 2-D sensor is composed of a specific amount (X) of linear sensors, wherein each of the linear sensors has a plurality of memory cells that are each independent on others and can be read separately, wherein each parameter is a positive integer

corresponding to a signal linear sensor.

Referring to step 32, proceeding the following reading actions for each of the linear sensors from the first one of them.

Referring to step 33, numbering memory cells sequentially depending on the linear arrangement order from the first memory cell until the (N-1)-th memory cell when the K-th linear sensor is to be handled, wherein N is the parameter corresponding to the K-th linear sensor.

Referring to step 34, reading the contents of the unnumbered memory cells corresponding to the linear arrangement order sequentially.

Obviously, a 2-D sensor can be considered as the combination of a plurality of 1-D linear sensors. Thus, the second embodiment basically repeats the proceedings of the first embodiment several times, the difference is that the first embodiment accepts only one parameter and the second embodiment accepts many parameters. If some linear sensors contain meaningful (or user-demanded) data in all memory cells, the parameters corresponding these linear sensors are zero. Of course, the format of the parameters can be variable. The format can be interlaced arranged with the numbers of linear sensors and the parameters, or it can be the numbers and the parameters of linear sensors not needed to be read from the first. The second embodiment is not limited by these details.

Certainly, in the second embodiment, the memory cell to be read first will be amended according to the corresponding parameter whenever a linear sensor is to be read. How long ago the parameter is received is not important. Though FIG. 3A shows that all parameters are received first and then each linear sensor is handled sequentially, the second embodiment can be to receive the corresponding parameter whenever a linear sensor begins to be handled. Referring to FIG. 3B, a third embodiment of the present invention, merely replacing the step 31 and step 32 with a step 311 and step 321.

Owing to the other detail of the third embodiment is the same as the second embodiment, such as corresponding the attached parameter to stop reading a certain linear sensor, no more redundant statement of the detail is made.

The features of the second and third embodiments that are "to only read data of memory cells with number not smaller than the parameter" and "to only read data of memory cells with number not larger than the attached parameter" can further expand to read only some memory cells marked by some parameters.

Referring to FIG. 4, which is a fourth embodiment of the present invention. Before reading a certain linear sensor 41 of the sensor, receiving a plurality of parameters (N1, N2, ... Nn) first, then finding out n specific memory cells 42 with number corresponding to these parameters in the linear sensor 41. Pairing these specific memory cells 42 off from the first specific memory cell 42, and each pair of specific memory cells 42 marks a specific memory cell division 43. Finally

reading out the stored data 44 of each specific memory cell division 43.

The situation referring to FIG. 4 is just inputted even parameters. The fourth embodiment takes advantage of a plurality of parameters to mark some specific divisions ready for reading and a specific division can be in the start of the first memory cell or in the end of the last memory cell. However, the fourth embodiment can also receive odd parameters.

Owing to the other detail of the second and third embodiments is the same as the fourth embodiment, i.e. all are suitable for 1-D or 2-D sensors, no more redundant statement of the detail is made.

The preferred embodiments are only used to illustrate the present invention; it is not intended to limit the scope thereof. Many modifications of the embodiments can be made without departing from the spirit of the present invention.